	Pressure.	Vapour Tension.
September	·341 in.	·779 in.
October	·546	·464
November	·669	·335
December	·709	·268

By inserting these figures and those for dust above given in the formula, $log\ p = b\ log\ a + f\ log\ \beta + d\ log\ \gamma$, it is found that the most probable values of the constants are :—

$$a = \cdot 99518$$
$$\beta = \cdot 78091$$
$$\gamma = \cdot 98924$$

These results, while confirming those already arrived at, indicate that the absorption of solar radiation by dry air is greater than I have hitherto supposed, though not nearly so great as the absorption by water vapour.

IV.—*List of the Butterflies of Calcutta and its Neighbourhood, with Notes on Habits, Food-plants, &c.*—*By* Lionel de Nice'ville.

[Received 15th October ;—Read 3rd December, 1884.]

In the 'Entomologist's Monthly Magazine,' 1882 vol. XIX, p. 33, there is a paper by Mr. G. A. J. Rothney, entitled, "A list of the Butterflies captured in Barrackpore Park during the months of September, 1880, to August, 1881." In this list, however, only 98 species are mentioned, which probably all occur in Calcutta, the two places being but 14 miles apart, and both situated on the low-lying deltaic banks of the Hughli. I have accordingly included all those of Mr. Rothney's species which I have not myself met with in Calcutta, distinguishing them by an asterisk prefixed to the serial number.

One of the most interesting points to which my attention has been drawn in these butterflies is the occurrence of seasonal dimorphism, there being in several species an ocellated form which occurs only in the rains, the cold and dry seasonal being non-ocellated. The constancy of this phenomenon is such that I cannot help thinking there must be some physical reason for it, can it be a protective one ? The difference in the garb of the surrounding vegetation makes it little remarkable that a change should be found in the coloration of the butterflies of the two seasons, but it is difficult to see why this change should show itself in the obliteration or development of ocelli. The only hypothesis which I can suggest is, that during the rains the density of the vegetation is such

that the butterflies can easily hide their conspicuous ocelli, while in the cold and dry seasons the ocelli, easily seen through the scantily-clothed jungle, would render the butterflies an easy prey to their inveterate enemies the birds, lizards, and insectivorous insects; so that the ocellation being a cause of danger would have a worse chance of survival, and consequently would be gradually wiped out by a process of a survival of the fittest, the fittest in this case being the least gaudily-marked individuals. Were this the case, however, the non-marked forms would certainly survive during the rains, for their homeliness of coloration, though no longer absolutely essential, would still give them an advantage over their ocellated brethren, unless indeed the ocelli are preserved by sexual selection at this time when the struggle for bare existence is not so keen as at other seasons.

Suborder RHOPALOCERA.

Family Nymphalidæ.

Subfamily Danainæ.

* 1. Danais (Parantica) aglea, Cramer.

I have never met with this species, Mr. Rothney records it as 'rare.'

2. Danais (Tirumala) limniace, Cramer.

Very common everywhere at all seasons.

3. Danais (Limnas) chrysippus, Linnæus.

The commonest butterfly met with here as elsewhere.

4. Danais (Limnas) alcippoides, Moore.

A single individual has been taken in a garden at Ballygunj in March. Since the first volume of 'The Butterflies of India' appeared, I have received single specimens of this erratic species from Fyzabad in Oudh, from Bholahát in the Malda district, and from Khurda, Orissa. I have no doubt in my own mind that *D. alcippoides* is a casual variety, aberration, or "sport" of *D. chrysippus*, which would almost certainly be proved to be the case by breeding from a batch of eggs laid by a female *D. alcippoides*, when I should expect to find all, or nearly all, the resultant butterflies of the true *chrysippus* form.

5. Danais (Salatura) genutia, Cramer.

Almost as common as the preceding.

6. Danais (Salatura) hegesippus, Cramer.

Decidedly a rare species, I have only seen seven specimens in all, five taken by myself in the two last months of three successive years, one taken by Mr. W. Doherty also in the cold weather, and one in March

in a garden at Ballygunj; all these specimens, except the last, were taken in the Sealdah district. This species is exceedingly common in some localities, Rangoon for instance; its rarity in Calcutta is a strange circumstance.

7. Euplœa (Crastia) core, Cramer.

A very common species occurring at all seasons.

8. Euplœa (Pademma) kollari, Felder.

By no means a rare species, and occurs in company with the preceding. Both species have a very strong but not actually disagreeable odour, which neither my friends nor I are able to compare with any named scent. The males of both species may often be observed patrolling a small aërial space with the end of the abdomen curled under the body towards the thorax, and with the two beautiful yellow anal tufts of long hair distended to their fullest extent at right angles to the body. It seems very probable that these tufts or brushes of hair are used like holy-water sprinklers (aspergilli) for disseminating the scent with which their bodies are charged as an attraction for the females or to warn off their enemies; but it should be observed that the females are similarly odoriferous, though they are unfurnished with the male disseminating organs.

Mr. Moore in one of his tables* of "Mimetic species of *Euplœinæ* [= *Danainæ*] (Group B)" gives these two species, with another that does not occur in the Calcutta district, as mimics. As far as these two species go at any rate, I do not think he is justified in surmising that one mimics the other. In the first place, as both are strong-scented, and, as far as my olfactory nerves show, have the same scent, it seems impossible to say which is the model and which the mimic, though *E. core* is the commoner species of the two. Again, for the same reason both would be equally distasteful to their enemies. On the wing I can generally distinguish the males of *E. kollari* from *E. core;* it is impossible, however, to distinguish between the opposite sexes of either of the two species when flying.

Subfamily Satyrinæ.

9. Mycalesis (Orsotriæna) medus, Fabricius.

Occurs somewhat sparsely during the rains, not met with in the winter or hot weather.

10. Mycalesis (Orsotriæna) runeka, Moore.

As above, but met with only in the cold and dry weather. I think it will hereafter be proved by breeding that these two supposed species are but seasonal forms of one species. For some reason at present un-

* Proc. Zool. Soc. Lond. 1883, p. 209.

known, the rainy season seems to give birth to ocellated forms amongst the *Satyrinæ*.

11. Mycalesis (Calysisme) blasius, Fabricius.

Not uncommon during the rains. The glandular patch of scales which is placed on the underside of the forewing on the submedian nervure in the middle of a nacreous patch in the male is *black* and small. Mr. Rothney's list gives an additional species (*M. samba*).

12. Mycalesis (Calysisme) perseus, Fabricius.

Very common during the cold and hot weather. The glandular patch is *black* and small.

13. Mycalesis (Calysisme) mineus, Linnæus.

Not uncommon during the rains. The glandular patch in this species is *ochreous* and large.

14. Mycalesis (Calysisme) indistans, Moore.

Common during the cold and hot weather. The glandular patch is *ochreous* and large.

Summary of the four preceding species. Breeding will almost undoubtedly prove that *M. perseus* is the dry season and *M. blasius* the wet season generation of one species, and that similarly *M. indistans* is the dry season and *M. mineus* the wet season generation of a second species, thus reducing the species of the subgenus *Calysisme* occurring in Calcutta to two species, an ocellated form of both with an inner white fascia (*M. blasius* and *M. mineus*) occurring during the rains, and a non-ocellated form with the white fascia obsolescent (*M. perseus* and *M. indistans*) occurring during the dry season.

15. Lethe europa, Fabricius.

In the cold weather this species affects dry ditches. It occurs also during the rains.

16. Ypthima philomela, Johanssen.

Common amongst grass throughout the rains.

17. Ypthima marshallii, Butler.

Common everywhere during the cold and hot weather. This and the preceding species are probably seasonal forms of one and the same species.

18. Ypthima huebneri, Kirby.

Common everywhere during the rains.

19. Ypthima howra, Moore.

Common everywhere during the cold and hot seasons. Similarly this species and *Y. huebneri* are probably but two generations of one and the same species, the strongly ocellated form in both cases occurring during the wet season.

20. Melanitis leda, Linnæus.

Very rare in Calcutta in the early winter, common during the rains.

21. Melanitis ismene, Cramer.

Common in the cold and dry seasons. Keeps in shade under trees and bushes and amongst dead leaves during the day, but flies about rapidly in the evening. I have but little doubt that this and the preceding species are but seasonal forms of a single species.

Subfamily Elymniinæ.

22. Elymnias undularis, Drury.

A common species. Feeds on *Palmaceæ*.

Subfamily Morphinæ.

23. Discophora tullia, Cramer.

I have taken this species in dry ditches during the cold weather only.

*24. Discophora zal, Westwood.

I have not met with this species. My Calcutta females of *D. tullia* do not at all agree with Westwood's figure of *D. zal*. Mr. Moore informs me *(in epis.)* that "*D. tullia* and *D. zal* are undoubtedly distinct species" and that he has "one male of *D. zal*, and it agrees well with its female, of which I have specimens, in having three rows of well-defined spots on both fore and hindwings."

Mr. Moore has of late placed some of the genera usually included under the subfamily *Morphinæ* under the subfamily *Nymphalinæ*. Had he ever had an opportunity of seeing these species alive, I am sure he would certainly never have done so; all of them affecting shade, flying but little unless disturbed, and resting near the ground with closed wings usually amongst dead leaves. In these habits they agree with the *Satyrinæ*, in which subfamily they might perhaps be placed, though in my opinion they are better left under a subfamily of their own; the bold flight and sunshine-loving habits of the *Nymphalinæ* (most of which, moreover, rest with wide-open wings) seeming entirely to forbid their being associated with that family.

Subfamily Acræinæ.

25. Telchinia violæ, Fabricius.

Common throughout the year.

Subfamily Nymphalinæ.

26. Cethosia cyane, Drury.

A single worn female taken in the cold weather in a garden at Alipur.

*27. Cirrhochroa anjira, Moore.

Mr. Rothney captured a single female specimen at Barrackpore. I have never met with it in Calcutta, but have received a single female from Bholahát in the Malda District.

28. Atella phalanta, Drury.

A very common insect at all seasons.

29. Pyrameis cardui, Linnæus.

A single female in the Botanical Gardens in November, one male at Ballygunj in March taken by Mr. T. G. H. Moncreiffe.

30. Junonia lemonias, Linnæus.

31. Junonia atlites, Linnæus.

Placed under *Precis laomedia* in the Barrackpore list.

32. Junonia œnone, Linnæus.

Common in the Botanical Gardens.

33. Junonia orithya, Linnæus.

Somewhat rare in Calcutta.

34. Junonia asterie, Linnæus.

35. Junonia almana, Linnæus.

J. almana is almost undoubtedly the dry season and *J. asterie* the wet season form of one and the same species.

36. Precis iphita, Cramer.

A single male taken in March in a garden at Ballygunj.

37. Ergolis indica, Moore.

Common. Larvæ feed on *Tagia involucrata*, a twining plant with hairy stinging leaves.

Mr. Moore has lately separated this species from the Javan *E. ariadne;* under which name it appeared in the Barrackpore list.

38. Ergolis merione, Cramer.

Common. Larva feeds on the castor-oil plant, *Ricinus communis.*

39. Hypolimnas bolina, Linnæus.

Common except in the cold weather. Mr. Moore also gives *H. jacinthà*, Drury, as a separate species. I believe it, however, to be one of the numerous varieties or seasonal forms of *H. bolina.*

40. Hypolimnas misippus, Linnæus.

Much rarer than *H. bolina.* Both forms of the female occur here. The larva feeds on *Portulaca meridiana* in Calcutta.

41. Limenitis procris, Cramer.

Common, fond of settling high up in the trees with wings widely spread open. Larva feeds on *Anthocephalus cadamba.*

42. Neptis nandina, Moore.

I have taken this insect in the cold weather only; it is rare.

43. Neptis ophiana, Moore.

I have taken a single female specimen only in February.

44. Neptis jumbah, Moore.

Common. It has a much bolder and stronger flight than the other species of *Neptis* occurring in Calcutta, and differs from every species of the genus known to me in having a small round brown spot near the base of the hindwing on the underside.

45. Neptis kamarupa, Moore.

The commonest *Neptis* occurring in Calcutta, and on the wing throughout the year.

46. Neptis varmona, Moore.

There are three specimens of this species in the Indian Museum, Calcutta, but I have never taken it here. It is recorded from Barrackpore.

47. Neptis (Rahinda) plagiosa, Moore.

Somewhat rare, taken in the cold weather only.

48. Athyma perius, Linnæus.

Two specimens only taken in the cold weather.

49. Euthalia garuda, Moore.

Very common. Larva feeds on mangoe.

50. Euthalia lubentina, Cramer.

Rare. I have taken females only.

51. Symphædra nais, Forster.

A single specimen taken by Mr. R. E. S. Thomas in Calcutta, which is probably its extreme eastward range. Common in the Rajmahal Hills.

52. Charaxes fabius, Fabricius.

Somewhat rare. I have taken nearly all my specimens in the cold weather, sucking up the juice from the date-palms when cut for toddy. It occurs also in the rains.

53. Charaxes *prox.* hindia, Butler.

I took a single female specimen in a garden at Alipur in the cold weather which agrees fairly with *C. hindia*. It has a narrow rufous outer margin to the upperside of the forewing, and the outer black macular fascia on the hindwing less conspicuous than in that species.

Family LEMONIIDÆ.

Subfamily Nemeobiinæ.

54. Abisara suffusa, Moore.

Common at all times except in the three coldest months. Has a very quick flight, but settles often on the upperside of a leaf in the shade with half-expanded wings.

Family LYCÆNIDÆ.

55. Spalgis epius, Westwood.

Taken on two occasions only in August in the Botanical Gardens flying about a pomegranate bush.

56. Megisba thwaitesi, Moore.

A single specimen taken in February. It probably is often overlooked owing to its close general resemblance to the species of the genus *Neopithecops*, which often actually swarm amongst bushes in shade.

57. Neopithecops gaura, Moore.

58. Neopithecops zalmora, Butler.

This species has never been properly characterized, and I am unable to say in what particulars it is supposed to differ from *N. gaura*. At any rate the species of *Neopithecops* occurring in Calcutta are exceedingly variable, some specimens are entirely black on the upperside, others have the costal and outer margins of the fore and hindwings black, all the rest of the surface white, and there is every gradation between these extremes.

Mr. Moore writes to me—"*N. gaura* can be distinguished by its broad white discal area in both wings of both sexes. *N. zalmora* has a small discal white patch in the forewing only. I have both from the Calcutta district."

59. Curetis thetys, Drury.

Not uncommon amongst trees and high bushes, it generally settles with closed wings on the underside of a leaf out of reach. The female is dimorphic, one form having the discs of the wings above white, the other having them ochreous.

60. Chilades varunana, Moore.

Not common.

61. Chilades laius, Cramer.

Not common. It is synonymous with the *C. kandura* of Moore.

62. Zizera karsandra, Moore.

Not common.

63. Zizera diluta, Felder.

Common everywhere amongst grass.

64. Zizera sangra, Moore.

Swarms amongst the grass at certain seasons.

65. Zizera pygmæa, Snellen.

Somewhat rare.

66. Tarucus theophrastus, Fabricius.

Rare.

67. Tarucus plinius, Fabricius.

Somewhat common. Very pugnacious.

68. Castalius rosimon, Fabricius.

Fairly common amongst grass.

69. Jamides bochus, Cramer.

Common amongst trees.

70. Lycænesthes bengalensis, Moore.

Rare, occurs throughout the year.

71. Nacaduba ardates, Moore.

Rare. Occurs amongst bushes.

72. Catochrysops strabo, Fabricius.

Common.

73. Catochrysops cnejus, Fabricius.

Common.

74. Catochrysops pandava, Horsfield.

Common. In April and May I have found the larvæ swarming on the hardly-open shoots of *Cycas revoluta*, thereby utterly destroying the appearance of the plant for the year. There is also a brood out in the rains.

75. Catochrysops bengalia, n. sp.

Male. Upperside violet-blue; the *cilia* dusky. *Forewing* with the outer margin narrowly black. *Hindwing* with a marginal series of dusky oval spots, the third from the anal angle larger, black and round; an anteciliary black line; tail dusky with a white tip. Underside gray; the *cilia* gray spotted with dusky. *Forewing* with a white-bordered brownish spot closing the cell, a curved discal series of joined similar spots, two series of marginal lunules; a black anteciliary line. *Hindwing* with four subbasal dusky spots surrounded with white. A much curved discal series, the upper spot on the costa usually the most prominent, and a spot closing the cell; marginal lunules much as in the forewing, but more prominent; a small black spot faintly crowned with orange in the first median interspace and three very minute anal ones beyond it, all four sometimes absent. In some specimens the discal series of spots on the forewing are much elongated towards the middle of the wing, and in all the specimens I have seen, except two from Sikkim, the spots on the disc and the one closing the cell of the hindwing have coalesced, forming an irregular brown patch in the middle of the wing, which patch sometimes reaches and includes the subbasal spots.

Female. Upperside shining iridescent violet-blue. *Forewing* with the apex widely and the outer margin decreasingly black. *Hindwing* with the costal margin dusky. Otherwise as in the male.

Expanse: ♂ ♀, 1·2 inches.

Near to *C. pandava*, Horsfield. Male smaller than that species, of a paler shade of blue; differing on the underside, in the coalescing of the discal spots, and the anal spots of the hindwing being much smaller or absent altogether. The female on the upperside is of quite a different shade of blue, which colour reaches to the costa and much nearer to the margin in the forewing, and covers all the hindwing except the costal

margin. The marginal series of black spots are smaller, more regular in size, and the third from the anal angle not conspicuously crowned with orange as in *C. pandava*.

I have taken numerous specimens of both sexes in the cold weather in Calcutta, and Mr. Nevill took it at Moisraka. It occurs also in Sikkim.

76. Polyommatus bæticus, Linnæus.

Common.

77. Lampides ælianus, Fabricius.

Common.

78. Lampides elpis, Godart.

Rare.

79. Iraota mæcenas, Fabricius.

Rare. Occurs amongst trees, especially the banian-tree, on which the larva feeds.

80. Deudorix dieneces, Hewitson.

Taken only in the winter on the flowers of *Poinsettia pulcherrima*.

81. Baspa melampus, Cramer.

I have taken a male and two females only.

82. Rathinda amor, Fabricius.

Recorded from Calcutta by Mr. Moore in P. Z. S. 1865, p. 776, under the name of *Myrina triopas*, Cramer.

83. Virachola isocrates, Fabricius.

Common in the winter on the *Poinsettia*. Larva bred in March from the fruit of the pomegranate.

84. Rapala schistacea, Moore.

Very common throughout the year. I have bred the larva from a plant growing in the Botanical Gardens, Calcutta. The larva and pupa agree exactly with the figures of an undetermined species given in Horsfield and Moore's Cat. Lep. Ins. Mus. E. I. Co. pl. xii, figs. 4, 4*a*., and which is probably *Rapala varuna*, Horsfield, a Javan species.

85. Rapala orseis, Hewitson.

A single male specimen taken in April on the flowers of *Diospyros montana*. *R. lazulina* from Ceylon is very closely allied to this species, but unlike my specimen it is not glossed with purple on the underside, which Hewitson gives as a distinguishing character of his *R. orseis*.

86. Spindasis khurdana, Moore.

A single male has been so identified by Mr. Moore.

87. Spindasis trifurcata, Moore.

There is a single male specimen in the collection of the Indian Museum, Calcutta.

88. Spindasis vulcanus, Fabricius.

This species appears in Mr. Rothney's list under its synonymic name *Aphnæus etolus*. It is the commonest species of the genus occurring in Calcutta.

89. Spindasis tigrina, Moore.

Mr. Moore has identified some Calcutta specimens of *Spindasis* as this species. He has also queried other specimens of this and the preceding species; which, taken with the fact that *S. vulcanus* is very variable and the differences given between it and *S. tigrina* are very slight, suggests the suspicion that the latter species is at best but a doubtfully good one.

90. Tajuria longinus, Fabricius.

I have taken it rather plentifully in the winter on the flowers of the *Poinsettia*. It occurs also at other seasons.

91. Pratapa cleobis, Godart.

Taken with the preceding.

92. Sithon indra, Moore.

Rare, but occurs at all seasons. I have taken males only.

93. Loxura atymnus, Cramer.

Common.

94. Mahathala ameria, Hewitson.

Rare, always found high up amongst trees.

95. Nilasera amantes, Hewitson.

I took a single male specimen in the Botanical Gardens in May.

96. Satadra atrax, Hewitson.

Recorded from Calcutta by Mr. Moore in P. Z. S. 1865, p. 774. Captain Sage has taken a single specimen in May.

97. Amblypodia naradoides, Moore.

I have seen a single female only of this species, which was taken in the compound of the Indian Museum, Calcutta.

Family PAPILIONIDÆ.

Subfamily Pierinæ.

98. Leptosia xiphia, Fabricius.

Met with commonly almost throughout the year.

99. Terias hecabe, Linnæus.

Common at all seasons. The males of this, as of all the species of the *T. hecabe* group, have the scales on both sides of a small portion of the median nervure of the forewing near the base on the

underside of a pale violet colour, and the subjacent portion of the wing membrane slightly depressed. On holding a male insect up to the light this secondary sexual character can be at once detected.

100. Terias simulata, Moore.

This species and the next have the male mark above referred to.

101. Terias purreea, Moore.

Taken in the cold weather, not common.

102. Terias læta, Boisduval.

There is one specimen of this species in the Indian Museum, Calcutta. *T. laeta* and allied species have in the male an oval patch of ochreous scales on the underside of the forewing near the base below the median nervure.

103. Terias drona, Horsfield.

104. Terias rubella, Wallace.

Taken in December.

105. Catopsilia catilla, Cramer.

106. Catopsilia crocale, Cramer.

Feeds on *Cassia fistula.*

107. Catopsilia gnoma, Fabricius.

108. Catopsilia pyranthe, Linnæus.

Feeds on *Cassia fistula.*

*109. Catopsilia ilea, Fabricius.

110. Ixias ganduca, Moore.

Occurs in February, and again during the rains. *I. latifasciata*, Butler, is given in Mr. Rothney's list, but *I. ganduca* is probably meant.

111. Ixias marianne, Cramer.

Very rare.

112. Huphina phryne, Fabricius.

Common, feeds on *Capparis horrida.* It appears in Mr. Rothney's list under its synonymic name *H. evagete*, Cramer (*teste* Moore, P. Z. S. 1882, p. 255.)

113. Huphina hira, Moore.

I think that this is only a seasonal (winter) form of the preceding species, which is a very variable one.

114. Huphina zeuxippe, Cramer.

This also appears to me to be a seasonal or varietal form of *H. phryne.*

*115. Catophaga paulina, Cramer.

116. Catophaga darada, Felder.

I have taken a single male specimen only in August.

117. Appias zelmira, Cramer.

I have seen a single male specimen taken in Calcutta.

118. Appias hippoides, Moore.

I took a single male in a garden at Sealdah in November.

119. Hiposcritia imbecilis, Moore.

A single male taken in February. It differs from that species in having the markings of the underside more pronounced, and also in having a diffused black spot on the underside of the forewing between the upper median nervules. It is doubtfully distinct from *H. indra*, Moore.

120. Belenois mesentina, Cramer.

Common. Feeds on *Capparis horrida.*

121. Nepheronia gæa, Felder.

Very common. The female is dimorphic; the form which has the base of the wings yellow is rare. Feeds on *Capparis horrida.*

*122. Nepheronia hippia, Fabricius.

I have taken but one species of *Nepheronia* in Calcutta. *N. hippia* is unknown to me; unless it is synonymic with *N. gaea*, which is very probable. Mr. Wallace in his paper* on Eastern *Pieridæ* unites them as one species.

123. Delias eucharis, Drury.

Swarms in the winter, specimens are to be met with throughout the year.

124. Delias hierte, var. indica, Wallace.

A single male taken in February.

Subfamily Papilioninæ.

125. Papilio (Pathysa) nomius, Esper.

This species comes out in profusion in March, and is the only single-brooded species in Calcutta with which I am acquainted. Larva feeds on *Polyalthia longifolia.*

126. Papilio (Zetides) doson, Felder.

Appears about the same time as the preceding, and specimens may be met with throughout the summer, but the spring brood is the largest. Larva feeds on the young leaves only of *Polyalthia longifolia.*

127. Papilio (Harimala) crino, Fabricius.

First appears in March, individual specimens met with throughout the hot weather. Very difficult to capture, and the rarest *Papilio* in Calcutta.

128. Papilio (Orpheides) erithonius, Cramer.

Very common. I have bred the larva from *Ægle marmelos.*

129. Papilio (Iliades) polymnestor, Cramer.

First appears at the end of March, specimens occur throughout the hot weather. I have bred the larva on pomelo (*Citrus decumana*).

* Trans. Ent. Soc. Lond. 3rd series, vol. iv, p. 388.

130. Papilio (Laertias) pammon, Linnæus.

The commonest *Papilio* in Calcutta. All three forms of the female occur, the third form which mimics *P. hector* being the rarest. Larva reared on *Glycosmis pentaphylla*, *Ægle marmelos*, and the common lime.

131. Papilio (Menelaides) aristolochiæ, Fabricius.

Very common. Has a strong scent, and called the 'Rose Butterfly' in consequence by Calcutta schoolboys. Feeds on *Aristolochia*.

132. Papilio (Menelaides) hector, Linnæus.

Rare in Calcutta, taken in Chandernagore commonly in November. Also has a strong scent, and larva feeds on *Aristolochia*.

133. Papilio (Chilasa) dissimilis, Linnæus.

Not rare in the hot weather. On the wing it may often be mistaken for *Danais limniace*.

134. Papilio (Chilasa) casyapa, Moore.

Occurs in the hot weather. Mimics the Calcutta species of *Euplœa*. Both this species and the preceding feed on *Antiaris todicaria*. The larvæ and pupæ of the one are indistinguishable from those of the other, and both species, or species allied to both, occur always together in all parts of India; it therefore appears to me not improbable that they are one and the same species.*

Family HESPERIIDÆ.

135. Badamia exclamationis, Fabricius.

Occurs sparingly throughout the year except in the coldest months.

136. Parata chromus, Cramer.

I took a single male in the garden of the Seven Tanks in July.

137. Astictopterus olivascens, Moore.

Rare. Occurs amongst grass in shade.

138. Astictopterus salsala, Moore.

A very common species. Mr. Moore informs me that "the female of *A. salsala* has a curved discal row of seven white spots and two lower ochraceous discal spots, and is a larger species than *A. stellifer*, Butler," which latter has been described from Malacca and Ceylon, and appears to me to be identical with *A. salsala*.

139. Matapa aria, Moore.

Common throughout the year, actually swarms on sweet-scented flowers in the evenings during the rains.

140. Telegonus thrax, Fabricius.

Rare. Occurs in September.

* Since writing the above, I accidently came across the following note in the P. Z. S. 1865, p. 756—"*P. dissimilis* and *P. panope* taken in *coitu*.—*A. E. Russell*."

141. Gangara thyrsis, Fabricius.

Not uncommon, flies in the evening, rests during the day, usually on tree trunks, with closed wings. I have reared the larva on the date and other palms.

142. Baoris oceia, Hewitson.

A single male taken in August of the normal eight-spotted form. Mr. Moore has lately (P. Z. S. 1883, pp. 532, 533) described two species of this genus from the Andamans and Darjiling respectively which I consider to be only varieties of *B. oceia*, that species in the number of its spots being the most variable hesperid I know, as previously pointed out by Mr. Wood-Mason and myself in a paper on the butterflies of the Andaman Isles (J. A. S. B. 1881, vol. l, pt. ii, p. 259).

143. Parnara kumara, Moore.

A single male taken in February. Mr. Moore places this species in the genus *Baoris*, but, as it lacks the large tuft of hair in the middle of the hindwing on the upperside in the male which is the distinguishing feature of that genus, it appears to be better placed under *Parnara*.

144. Parnara narooa, Moore.

A single male taken in the Botanical Gardens in August.

145. Parnara farri, Moore.

One female only taken in February.

146. Parnara bada, Moore.

Common.

147. Parnara bevani, Moore.

There is a single pair of this species in the Indian Museum, Calcutta, taken by Mr. Nevill in February, 1871.

148. Suastus gremius, Fabricius.

Common. Larva reared on the date-palm.

149. Chapra subochracea, Moore.

Rare. Taken in November.

150. Chapra agna, Moore.

A common species.

151. Telicota bambusæ, Moore.

Very common at all seasons.

152. Telicota augias, Linnæus.

Rare.

153. Padraona palmarum, Moore.

Common.

154. Padraona dara, Kollar.

Rare, taken in August.

155. Ampittia maro, Fabricius.

Taken on one occasion in the Botanical Gardens in August.

156. Taractrocera sagara, Moore.

Rare. Taken in May and August.

157. Halpe beturia, Hewitson.

Common. Generally keeps high up amongst trees.

158. Hyarotis adrastus, Cramer.

Rather common.

159. Tagiades ravi, Moore.

Rare, rests with out-spread wings, often on the underside of a leaf.

160. Tagiades khasiana, Moore.

As above; somewhat plentiful in the rains.

161. Udaspes folus, Cramer.

Rather common.

162. Coladenia tissa, Moore.

I have taken a single male specimen in February in a garden at Alipur. In the rains another brood appears, which differs from the cold weather generation in having the ground-colour of both wings umber-brown, instead of ochreous, and all the black spots and markings more prominent.

163. Hesperia galba, Fabricius.

Decidedly rare in Calcutta, but occurs throughout the year.

V.—*Natural History Notes from H. M.'s Indian Marine Survey Steamer 'Investigator,' Commander* Alfred Carpenter, R. N. *Commanding. No.* 1. *On the Structure and Habits of* Cyrtophium calamicola, *a new Tubicolous Amphipod from the Bay of Bengal.—By* G. M. Giles, M. B., F. R. C. S., *Surgeon-Naturalist to the Marine Survey.*

(With Plate I.)

[Received 6th March;—Read 1st April, 1885.]

The little organism I am about to describe is one of the numerous objects that are found in the surface-net about the Palmyras shoal and mouth of the Dhamra river on the Orissa Coast. To this, or, at any rate, to such situations, it appears to be confined, for it was not met with either in the deep water of the Bay of Bengal, or in the clear blue shallow water about the Cheduba archipelago.

Shortly after commencing surface-net work in the above locality, I noticed amongst the hauls a body moving with tolerable activity, in appearance much like a morsel of drift wood. It swam about the tube in which it had been placed for observation in a nearly upright posture, sometimes upwards, sometimes obliquely across it, at others allowing itself to sink to the bottom. On closer examination, the four antennæ of a minute crustacean were seen protruding from one end;